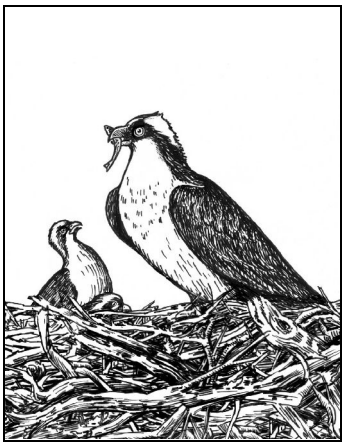
Upper Columbia Basin Network
Osprey Protocol Development Summary
(July 2008)



Protocol: Osprey

Parks Where Protocol will be Implemented: LARO

Justification/Issues being addressed:
Indicator species help researchers and resource managers by providing information on the overall condition of an ecosystem. For several reasons raptors can be extremely useful indicators of environmental change. Raptors occupy most ecosystems, cover large home ranges, are often migratory, top predators in complex food webs, and sensitive to environmental contaminants and other human disturbances (Bildstein 2001). The osprey is an excellent example of one of these potential indicator species.

North American osprey populations began to drastically decline in the early 1950s and declines continued through the early 1970s (Reese 1972; Poole 1989). Environmental pollutants such as Dieldrin, DDE, and PCB, have been listed as the primary cause of declines. These pollutants bioaccumulate in the aquatic flora and fauna and, since fish constitute 99% of an osprey diets, pollutants accumulate rapidly in osprey tissue. At high levels, these contaminants cause eggshell thinning and decreased egg viability (Ames 1966; Wiemeyer et al. 1978; Steidl et al. 1991). With restrictions and bans on many of these pollutants in the 1980s, osprey numbers appear to have rebounded and are flourishing in many areas (Titus and Fuller 1990). However, the presence of contaminants still remains a concern in many areas, including LARO.

The osprey is a common breeding resident in LARO and is at risk of environmental contamination. Contaminants found in the sediments of the Upper Columbia River consist of heavy metals such as antimony, arsenic, cadmium, copper, lead, mercury, and zinc, as well as organic contaminants such as polychlorinated dibenzo-p-dioxins (dioxins), polychlorinated dibenzofurans (furans) and PCBs (EPA 2006). Known and potential sources of contaminants in LARO include mining and milling operations, smelting operations, pulp and paper production, sewage treatment plants, and other industrial activities (EPA 2006). One of the largest sources of contamination in LARO is the TechCominco Smelter, located along the Columbia River approximately 16 km (10 mi) north of the US border. This smelter has been discharging pollutants for over 100 years, making it the single largest source of heavy metal contaminants in the Upper Columbia River (EPA 2006). Lake Roosevelt is currently being considered for addition to the EPA National Priorities List as a superfund site (USGS 2003).

Increased human recreational activity is an additional stressor on osprey populations in LARO. While reservoirs and man-made nesting structures such as telephone poles and artificial platforms benefit osprey, high levels of human activity in the vicinity of active nests may be adversely affecting successful reproduction (D'Eon and Watt 1994). The effect of human disturbance on osprey is dependent on several factors including the timing, frequency, and

intensity of disturbance as well as the degree of osprey habituation. Recreational activity at LARO has been steadily increasing over time, and in 2005, LARO attracted over 1 million visitors. Most of these are summertime watercraft users, and because osprey typically nest on or near the lakeshore and forage exclusively over open water, an inherent conflict exists.

Monitoring of osprey is a critical element in the suite of information needed by LARO managers to adequately understand and manage park ecological condition. Though there have been several studies over recent years examining the presence of contaminants within LARO, little information is available regarding osprey in the area and few studies (if any) have researched the potential impacts of these contaminants on osprey and other avian wildlife (Henny 2005). The UCBN I&M Program seeks to support LARO staff by developing a simple and effective long-term monitoring protocol that will provide timely information on osprey nest occupancy and productivity. We will assist LARO in the identification of desired target values for occupancy and productivity, as well as conservative thresholds that, if crossed, might trigger management action. Because of the complexity of land ownership and management responsibilities in the Lake Roosevelt area, NPS management options are limited. However, osprey declines exceeding established thresholds may be used to garner support among other area stakeholders to support additional research or alternative management strategies.

Specific Monitoring Questions and Objectives to be Addressed by the Protocol:
Monitoring questions addressed by this protocol include:

- Are trends in occupancy and productivity associated with nest structure and human disturbance patterns?
- Is the phenology of osprey nesting and fledgling changing over time?
- What is the proportion of nests occupied in LARO? What is the trend in nest occupancy?
- What is the trend in productivity as measured by the number of fledglings per nest in LARO?

Monitoring objectives addressed by this protocol include:

1) Determine status and trend of nest occupancy for osprey in LARO.
   Justification: *Currently little information is available concerning osprey nesting activity in LARO. Osprey nests are relatively easy to locate and observe from the ground. Locating nests will provide information regarding nest structure, chronology, etc. It will also help to identify critical areas for increased protection.*

2) Determine status and trend of productivity (number of fledglings) for osprey in LARO.
   Justification: *Productivity is essential to maintaining a healthy population. Contaminants and human disturbance at LARO may be affecting osprey productivity. Knowing the level of productivity of this area will help managers better understand population condition and proceed to address issues of management concern.*

Basic Approach:
The UCBN will follow an occupancy estimation approach as outlined by Mackenzie et al. (2006), which involves repeated within-season nest surveys to determine nest occupancy and detectability, if determined that detectability is not close to 1. Because detectability of osprey

nests is assumed to be high this technique may not be necessary. Surveys for osprey nests in LARO will be conducted by boat and vehicle/foot during the period of egg incubation in May and June. Two surveys per season will be conducted for each survey area in order to permit detectability estimation. The lake will be divided into three sections, and surveys in each section will occur once every three years, in a [1-2] rotating panel design. Aircraft or helicopter will be used during the initial implementation of the protocol as a means to exhaustively survey the lake and identify all known historic and extant nests. Periodic resurveys of the lake with aircraft will be conducted to add newly established nests to the sample pool. The primary survey measure (response) will be occupancy as indicated by presence of birds in the nest. Our second objective related to productivity will be met by revisiting active nests within season (July) when fledglings are approximately 45 days old and conspicuous enough to allow accurate counts by observers on the ground or a boat. Additional covariate measures taken for each nest will include those related to structure (type, height), location (distance to water, distance to boat landings), weather, and visitation patterns. Our protocol will be developed and implemented in collaboration with other stakeholders in the lake vicinity and will include the Washington Department of Fish and Wildlife and the Confederated Tribes of Colville Indian Reservation. Existing protocols for osprey and analogous raptor monitoring efforts will be reviewed prior to allocating network funds for protocol development, and we will adopt and adapt suitable protocols to meet NPS I&M standards (Oakley et al. 2003).

Principle Investigators and NPS Lead:
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Development Schedule, Budget, and Expected Interim Products:
A draft protocol ready for peer-review will be complete in January 2009.

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